

SCIENTIFIC LETTER

Day-case transfer for percutaneous coronary intervention with adjunctive abciximab in acute coronary syndromes

D J Blackman, N R Clarke, W P Orr, E Wilkinson, A Beswick, D Coppock, D C Spriggins, A P Banning

Heart 2002;87:375–376

Early revascularisation improves outcome in patients with non-ST elevation acute coronary syndromes (ACS),^{1,2} particularly if they are treated with adjunctive glycoprotein (Gp) IIb/IIIa inhibitors.² However, rates of angiography and revascularisation among patients with ACS in the UK remain among the lowest in Europe.³ One of the principal factors responsible for this underprovision is the lack of available beds in the regional cardiac centre, since standard management usually requires an overnight stay both before and after angiography. As a consequence, many ACS patients admitted to district general hospitals (DGHs) wait for several days or even weeks before transfer to the regional centre. This delay is expensive, and patients are at considerable risk of myocardial infarction or death during this period. We hypothesised that ACS patients likely to have disease amenable to percutaneous coronary intervention (PCI) could be managed by day-case transfer to the regional centre for angiography and PCI. This approach had not been previously thought possible because of concerns over the early mobilisation of patients following femoral puncture (particularly after administration of Gp IIb/IIIa inhibitors), concerns over the safety of early discharge from the regional centre, and because of the problem of coordination of ambulance transport. However, if it proved feasible, such a system could increase the availability and efficiency of percutaneous coronary intervention for patients with ACS admitted to DGHs throughout the UK.

METHODS

Patients admitted to a single DGH with non-ST elevation ACS (diagnosis requiring ischaemic chest pain with dynamic ECG changes and/or a raised serum troponin) were referred to the regional centre for urgent coronary angiography if they met any of the following criteria: (1) high risk ECG features (transient ST elevation, ST depression, deep anterior T inversion, left bundle branch block) and a raised troponin; (2) unstable symptoms ≤ 6 weeks post-myocardial infarction; (3) refractory symptoms; (4) positive symptom limited pre-discharge exercise tolerance test. Patients were excluded if they were thought unlikely to have disease amenable to PCI according to the following criteria: (1) age ≥ 80 years; (2) insulin treated diabetes mellitus; (3) peripheral vascular disease; (4) known multivessel disease on coronary angiography; (5) pulmonary oedema or haemodynamic compromise; (6) symptomatic coronary artery disease for more than one year, unless there was clear ECG evidence of a likely target vessel for revascularisation. Patients were also excluded if there were contraindications to Gp IIb/IIIa inhibitors (bleeding diathesis, international normalised ratio > 1.5 , platelet count $< 50 \times 10^9/L$, cerebrovascular accident, major surgery or major trauma within three months, active peptic ulcer disease).

Patients satisfying study criteria were transferred to the regional centre for angiography, underwent PCI when appropriate, and returned to the DGH the same day. Clopidogrel was administered as a 300 mg loading dose, followed by 75 mg

Table 1 Characteristics and outcome of patients undergoing day-case angiography

Patients (n)	50
Age (SD)	60 (10)
Mean (SD) TIMI risk score	3.9 (1.0)
Diseased vessels* (n)	
0	3
1	28
2	12
3	7
Treatment (n)	
Single vessel PCI	34
Two vessel PCI	11
Complete revascularisation	35
Partial revascularisation	10
CABG	2
Medical	3
Mean (SD) days until discharge	1.2 (0.4)
30 day outcome (n)	
Death/MI	0
MACE	1
Complications	
Femoral pseudoaneurysm	1
Femoral haematoma	3
Others	0

*Diseased vessel, $\geq 70\%$ stenosis.

CABG, coronary artery bypass graft; MACE, major adverse cardiovascular event: death/MI/revascularisation/cardiac readmission; MI, myocardial infarction; PCI, percutaneous coronary intervention.

daily for 28 days in those patients treated with stents. PCI was performed using a 6 French femoral approach, very low dose heparin (2500 or 5000 units), and intravenous abciximab (bolus and 12 hour infusion). The lower dose of heparin was used in patients undergoing single vessel PCI by direct stenting. The femoral sheath was removed immediately after the procedure, and haemostasis achieved using either manual compression or an "Angioseal" closure device. Patients were mobilised two hours after the procedure. Transfer back to the DGH was by trained volunteer ambulance service (St John's) with a nurse escort. In the absence of complications, discharge from the DGH was planned for the following day.

RESULTS

Over a nine month period 122 patients were referred for angiography from the DGH, of whom 50 (mean (SD) 60 (10) years; 38 men, 12 women) satisfied criteria for day-case transfer (table 1). Mean (SD) TIMI risk score in the day cases was 3.9 (1.0), confirming them as a high risk group (TIMI score 4

Abbreviations: ACS, acute coronary syndromes; DGH, district general hospital; Gp, glycoprotein; PCI, percutaneous coronary intervention; TIMI, thrombolysis in myocardial infarction

= predicted rate of death, myocardial infarction or revascularisation 19.9% at 14 days).⁴ Forty five out of 50 patients underwent PCI; 34 single vessel PCI, and 11 two vessel PCI. All lesions were treated with stents except one case of single vessel disease treated by angioplasty alone. Two patients were referred for bypass graft surgery; three had no culprit stenosis visible angiographically and were managed medically. Of the PCI patients, 36 were discharged the following day, eight after two days, and one after five days. The 30 day target vessel revascularisation rate was 2%; one patient was readmitted with unstable angina, and underwent further stent implantation because of dissection distal to the stent. There were no other major adverse cardiovascular events at 30 days, and the rate of death or myocardial infarction was zero. Three patients sustained significant groin haematomata which resolved spontaneously. One patient developed a femoral artery pseudoaneurysm which resolved with compression.

DISCUSSION

This study suggests that day-case transfer for femoral angiography and percutaneous coronary intervention with Gp IIb/IIIa inhibitors in selected patients with ACS is safe, practical, and effective. Using prespecified criteria, principally to exclude patients with characteristics known to be predictive of multivessel disease, we were able to select ACS patients likely to have disease amenable to PCI. This group constituted 41% of all non-ST elevation ACS patients referred for angiography during the study period, and 90% were subsequently treated by PCI. Administration of very low dose heparin in this study warrants further investigation. There is evidence that in the era of stent implantation with adjunctive Gp IIb/IIIa inhibitors, reducing heparin dose lowers bleeding risk without compromising outcome of PCI.⁵ This is supported by the low rate of femoral artery complications in this study, despite the rapid mobilisation of patients after intervention to allow same day transfer back to the DGH. The problem of ambulance provision was solved by using a trained volunteer ambulance service with a nurse escort.

Using prespecified criteria to identify suitable patients, and adjunctive abciximab with low dose heparin to optimise outcome without increasing bleeding risk, PCI can be carried out by day-case transfer from the DGH to the regional centre. This study indicates that such an approach is safe and effective, and may provide a template for management of selected ACS patients which could greatly enhance the provision of angiography and percutaneous revascularisation to this population in the UK.

ACKNOWLEDGEMENTS

We are grateful to Eli Lilly for the provision of abciximab and for support with funding, and to St Jude Medical UK for assistance with funding. We also thank the St John's ambulance service for providing transport.

.....

Authors' affiliations

D J Blackman, N R Clarke, W P Orr, E Wilkinson, D Coppock, A P Banning, Department of Cardiology, John Radcliffe Hospital, Oxford, UK
A Beswick, DC Spriggins, Department of Cardiology, Northampton General Hospital, Northampton, UK

Correspondence to: Dr Adrian P Banning, Department of Cardiology, John Radcliffe Hospital, Headington, Oxford OX3 9DU, UK; adrian.banning@orh.anglox.nhs.uk

Accepted 20 November 2001

REFERENCES

- 1 **Fragmin and Fast Revascularisation During Instability in Coronary Artery Disease Investigators.** Invasive compared with non-invasive treatment in unstable coronary artery disease: FRISC II prospective randomised multicentre study. *Lancet* 1999;**354**:701–7.
- 2 **Cannon CP, Weintraub WS, Demopoulos L, et al.** Comparison of early invasive and conservative strategies in patients with unstable coronary syndromes treated with Glycoprotein IIb/IIIa inhibitor Tirofiban. *N Engl J Med* 2001;**344**:1897–87.
- 3 **Fox KAA, Cokkinos DV, Deckers J, et al.** The ENACT study: a pan-European survey of acute coronary syndromes. *Eur Heart J* 2000;**21**:1440–9.
- 4 **Antman EM, Cohen M, Bernink PJLM, et al.** The TIMI risk score for unstable angina/non-ST elevation MI. *JAMA* 2000;**284**:835–42.
- 5 **Chew DP, Bhatt DL, Lincoff M, et al.** Defining the optimal activated clotting time during percutaneous coronary intervention. *Circulation* 2001;**103**:961–6.